

Name _____

One Factor Genetics Problems Review

For problems 1-4, do each of the following:

- Write the genetic cross for the parents (ex- Bb x bb)
- Show the work in a Punnett Square.
- State the genotypic ratio of the offspring.
- State the phenotypic ratio of the offspring.
- Determine the probability that the offspring would have the indicated genotypes and phenotypes.

1. Black coat color (B) in guinea pigs is dominant over white coat color (b).

Cross two heterozygous black guinea pigs.

♂ _____ X _____ ♀

GENOTYPE RATIO: _____

PHENOTYPE RATIO: _____

Probability offspring has genotype BB: _____

Probability offspring has genotype Bb: _____

Probability offspring has genotype bb: _____

Probability offspring has black fur: _____

Probability offspring has white fur: _____

2. In dogs, black fur (B) is dominant to white fur (b). Determine the expected genotypic and phenotypic ratios resulting from crosses between:

(a) homozygous black x white

(b) heterozygous black x white

(c) heterozygous black x homozygous black

a. ♂ _____ X _____ ♀

b. ♂ _____ X _____ ♀

c. ♂ _____ X _____ ♀

Genotype Ratio:

Genotype Ratio:

Genotype Ratio:

Phenotype Ratio:

Phenotype Ratio:

Phenotype Ratio:

Probability offspring has
genotype Bb:

Probability offspring has
genotype bb:

Probability offspring has
genotype BB:

3. In pea plants, axial flowers (A) are dominant over terminal (a). Determine the expected genotypic and phenotypic ratios resulting from crosses between:

- (a) homozygous axial x terminal
- (b) two heterozygous axial plants
- (c) heterozygous axial x terminal

a. ♂ _____ X _____ ♀

b. ♂ _____ X _____ ♀

c. ♂ _____ X _____ ♀

Genotype Ratio:

Genotype Ratio:

Genotype Ratio:

Phenotype Ratio:

Phenotype Ratio:

Phenotype Ratio:

Probability offspring is axial:

Probability offspring is terminal:

Probability offspring is axial:

4. In pea plants, gray seeds (G) are dominant to white seeds (g). Determine the expected genotypic and phenotypic ratios resulting from crosses between:

- (a) heterozygous gray x white seeds
- (b) two plants with white seeds
- (c) homozygous gray x heterozygous gray

a. ♂ _____ X _____ ♀

b. ♂ _____ X _____ ♀

c. ♂ _____ X _____ ♀

Genotype Ratio:

Genotype Ratio:

Genotype Ratio:

Phenotype Ratio:

Phenotype Ratio:

Phenotype Ratio:

Probability offspring has genotype Gg:

Probability offspring has genotype gg:

Probability offspring has genotype GG:

Problems 5-7 involve working backwards. Read each problem carefully and follow the directions. Make sure you answer all parts!

5. In pea plants, green pods (G) are dominant to yellow pods (g). If $\frac{1}{2}$ of the offspring have green pods and $\frac{1}{2}$ of the offspring have yellow pods, what are the genotypes of the parents? Show a Punnett square to prove your answer.

Genotypes of Parents: _____ X _____

6. Albino skin color is inherited as a recessive trait (a). An albino man marries a normally pigmented woman and they have nine children, all normally pigmented. What are the most likely genotypes of the parents? Show a Punnett square to prove your answer.

Male Genotype _____ X Female Genotype _____

7. A normally pigmented man (#1) whose father was an albino (#2) marries an albino woman (#3) whose parents were both normally pigmented (#4 & #5). They have three children, two normally pigmented (#6 & #7) and one albino (#8).

List the genotypes of each person mentioned in this problem.

#1 _____

5 _____

#2 _____

#6 _____

#3 _____

#7 _____

#4 _____

#8 _____